August 31, 1989

Docket No. 50-416

DISTRIBUTION
See attached sheet

Mr. W. T. Cottle
Vice President, Nuclear Operations
System Energy Resources, Inc.
Post Office Box 469
Port Gibson, Mississippi 39150

Dear Mr. Cottle:

SUBJECT: ISSUANCE OF AMENDMENT NO. 62 TO FACILITY OPERATING LICENSE NO. NPF-29 - GRAND GULF NUCLEAR STATION, UNIT 1, REGARDING TECHNICAL SPECIFICATIONS REVISIONS - THERMAL HYDRAULIC STABILITY (TAC NO. 71808)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 62 to Facility Operating License No. NPF-29 for the Grand Gulf Nuclear Station, Unit 1. This amendment consists of changes to the Technical Specifications (TS) in response to your application dated December 19, 1988, as revised February 24, 1989.

The amendment changes the TS by deleting TS 3/4.3.10, Neutron Flux Monitoring Instrumentation, and modifying TS 3/4.4.1, Recirculation System. Figure 3.4.1.1-1, Power Flow Operating Map, is changed to redefine flow stability regions. TS 3/4.4.1 is changed to reflect the redefined regions of Figure 3.4.1.1-1. The Bases for TS 3/4.3.10 and TS 3/4.4.1 are changed to reflect the changes in these TS.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's bi-weekly Federal Register notice.

Sincerely,

Original Signed By:
Lester L. Kintner, Senior Project Manager
Project Directorate II-1
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 62 to NPF-29
2. Safety Evaluation

cc w/enclosures:
See next page

DF01 1/1

[GGNS ISSU AMEND 71808]

OFC	LA:PD21:DRPR	PM:PD21:DRPR	D:PD21:DRPR	OGC		
NAME	PAnderson	LKintner:bld	EAdensam			
DATE	07/24/89	08/21/89	08/31/89	8/29		

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SYSTEMS ENERGY RESOURCES INC., et al.

DOCKET NO. 50-416

GRAND GULF NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 62
License No. NPF-29

1. The Nuclear Regulatory Commission (the Commission) has found that

   A. The application for amendment by System Energy Resources, Inc., (the licensee), dated December 18, 1988, as revised February 24, 1989, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications, as indicated in the attachment to this license amendment; and paragraph 2.C.(2) of Facility Operating License No. NPF-29 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 62 , are hereby incorporated into this license. System Energy Resources, Inc. shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Original Signed By:

Elinor G. Adensam, Director
Project Directorate II-1
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical Specifications

Date of Issuance: August 31, 1989

OFC	:LA:PD21:DRPR	:PM:PD21:DRPR	: OGC	:D:PD21:DRPR	:	:	:
NAME	: PAnderson	:LKintner:bld	:	: EAdensam	:	:	:
DATE	:07/24/89	:08/21/89	:08/ /89	:08/31/89	:	:	:

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ATTACHMENT TO LICENSE AMENDMENT NO. 62

FACILITY OPERATING LICENSE NO. NPF-29

DOCKET NO. 50-416

Replace the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

Remove	Insert
v	v
3/4 3-111	3/4 3-111
3/4 3-112	-
3/4 4-1	3/4 4-1
3/4 4-1a	3/4 4-1a
3/4 4-1b	3/4 4-1b
3/4 4-1c	3/4 4-1c
B3/4 3-7	B3/4 3-7
B3/4 4-1	B3/4 4-1
B3/4 4-1a	B3/4 4-1a
-	B3/4 4-1b

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

Pages 3/4 3-111 and 3/4 3-112 Intentionally Deleted

3/4.4 REACTOR COOLANT SYSTEM

3/4.4.1 RECIRCULATION SYSTEM

RECIRCULATION LOOPS

LIMITING CONDITION FOR OPERATION

3.4.1.1 The reactor coolant recirculation system shall be in operation with either:

a. Two recirculation loops operating with limits and setpoints per Specifications 2.1.2, 2.2.1, 3.2.1, and 3.3.6, or

b. A single recirculation loop operating with:

   1. A volumetric loop flow rate less than 44,600 gpm, and
   2. The loop recirculation flow control in the manual mode, and
   3. Limits and setpoints per Specifications 2.1.2, 2.2.1, 3.2.1, and 3.3.6.

Operation is not permissible in Regions A, B or C as specified in Figure 3.4.1.1-1 except that operation in Region C is permissible during control rod withdrawals for startup.

APPLICABILITY: OPERATIONAL CONDITIONS 1* and 2*.

ACTION:

a. With no reactor coolant system recirculation loops in operation and the reactor mode switch in the run position, immediately place the reactor mode switch in the shutdown position.

b. With operation in Region A as specified in Figure 3.4.1.1-1, immediately place the reactor mode switch in the shutdown position.

c. With operation in regions B or C as specified in Figure 3.4.1.1-1, observe the indicated APRM, neutron flux noise level. With a sustained APRM neutron flux noise level greater than 10% peak-to-peak of RATED THERMAL POWER, immediately place the reactor mode switch in the shutdown position.

d. With operation in Region B as specified in Figure 3.4.1.1-1, immediately initiate action to either reduce THERMAL POWER by inserting control rods or increase core flow if one or more recirculation pumps are on fast speed by opening the flow control valve to within Region D of Figure 3.4.1.1-1 within 2 hours.

e. With operation in Region C as specified in Figure 3.4.1.1-1, unless operation in this region is for control rod withdrawals during startup, immediately initiate action to either reduce THERMAL POWER or increase core flow to within Region D of Figure 3.4.1.1-1 within 2 hours.

f. During single loop operation, with the volumetric loop flow rate greater than the above limit, immediately initiate corrective action to reduce flow to within the above limit within 30 minutes.

*See Special Test Exception 3.10.4.

LIMITING CONDITION FOR OPERATION (Continued)

g. During single loop operation, with the loop flow control not in the manual mode, place it in the manual mode within 15 minutes.

h. During single loop operation, with temperature differences exceeding the limits of SURVEILLANCE REQUIREMENT 4.4.1.1.5, suspend the THERMAL POWER or recirculation loop flow increase.

i. With a change in reactor operating conditions, from two recirculation loops operating to single loop operation, or restoration of two loop operation, the limits and setpoints of Specifications 2.1.2, 2.2.1, 3.2.1, and 3.3.6 shall be implemented within 8 hours or declare the associated equipment inoperable (or the limits to be "not satisfied"), and take the ACTIONS required by the referenced specifications.

SURVEILLANCE REQUIREMENTS

4.4.1.1.1 At least once per 24 hours, the reactor coolant recirculation system shall be verified to be in operation and not in Regions A, B or C as specified in Figure 3.4.1.1-1 except that operation in Region C is permissible during control rod withdrawals for startup.

4.4.1.1.2 Each reactor coolant system recirculation loop flow control valve in an operating loop shall be demonstrated OPERABLE at least once per 18 months by:

a. Verifying that the control valve fails "as is" on loss of hydraulic pressure at the hydraulic unit, and

b. Verifying that the average rate of control valve movement is:

   1. Less than or equal to 11% of stroke per second opening, and

   2. Less than or equal to 11% of stroke per second closing.

4.4.1.1.3 During single loop operation, verify that the loop recirculation flow control in the operating loop is in the manual mode at least once per 8 hours.

4.4.1.1.4 During single loop operation, verify that the volumetric loop flow rate of the loop in operation is within the limit at least once per 24 hours.

LIMITING CONDITION FOR OPERATION (Continued)

4.4.1.1.5 During single loop operation, and with both THERMAL POWER less than 36% of RATED THERMAL POWER and the operating recirculation pump not on high speed, verify that the following differential temperature requirements are met within 15 minutes prior to beginning either a THERMAL POWER increase or a recirculation loop flow increase and within every hour during the THERMAL POWER or recirculation loop flow increase:

a. Less than 100°F, between the reactor vessel steam space coolant and the bottom head drain line coolant, and

b. Less than 50°F, between the coolant of the loop not in operation and the coolant in the reactor vessel, and

c. Less than 50°F, between the coolant in the operating loop and the coolant in the loop not in operation.

The differential temperature requirements 4.4.1.1.5.b and c do not apply when the loop not in operation is isolated from the reactor pressure vessel.

4.4.1.1.6 The limits and setpoints of Specifications 2.2.1, 3.2.1, and 3.3.6 shall be verified to be within the appropriate limits within 8 hours of an operational change to either one or two loops operating.

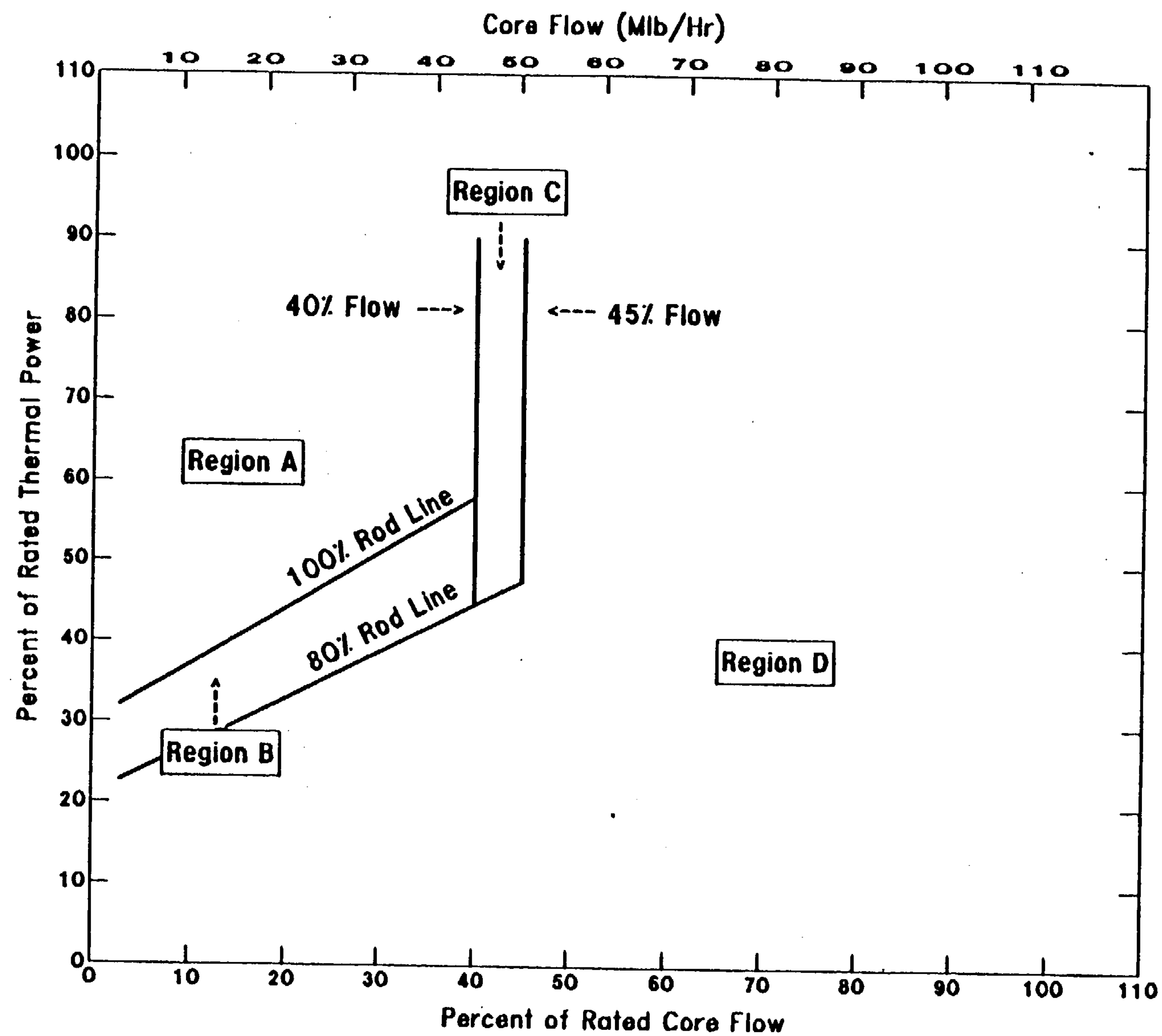

FIGURE 3.4.1.1-1 POWER-FLOW STABILITY REGIONS

3/4.3.9 TURBINE OVERSPEED PROTECTION

This specification is provided to ensure that the turbine overspeed protection instrumentation and the turbine speed control valves are OPERABLE and will protect the turbine from excessive overspeed. Protection from turbine excessive overspeed is required since excessive overspeed of the turbine could generate potentially damaging missiles which could impact and damage safety-related components, equipment or structures.

3/4.3.10 DELETED

3/4.4.1 RECIRCULATION SYSTEM

Operation with one reactor core coolant recirculation loop inoperable has been evaluated and found to remain within design limits and safety margins provided certain limits and setpoints are modified. The "GGNS Single Loop Operation Analysis" identified the fuel cladding integrity Safety Limit, MAPLHGR limit and APRM setpoint modifications necessary to maintain the same margin of safety for single loop operation as is available during two loop operation. Additionally, loop flow limitations are established to ensure vessel internal vibration remains within limits. A flow control mode restriction is also incorporated to reduce valve wear as a result of automatic flow control attempts and to ensure valve swings into the cavitation region do not occur.

An inoperable jet pump is not, in itself, a sufficient reason to declare a recirculation loop inoperable, but it does, in case of a design-basis-accident, increase the blowdown area and reduce the capability of reflooding the core; thus, the requirement for shutdown of the facility with a jet pump inoperable. Jet pump failure can be detected by monitoring jet pump performance on a prescribed schedule for significant degradation. During two loop operation, recirculation loop flow mismatch limits are in compliance with ECCS LOCA analysis design criteria. The limits will ensure an adequate core flow coastdown from either recirculation loop following a LOCA. In cases where the mismatch limits cannot be maintained, continued operation is permitted with one loop in operation.

The power/flow operating map is divided into four (4) regions. Regions A and B are restricted from operations. They include the operating area above the 80% rod-line and below 40% core flow. Region C includes the operating area above the 80% rod-line and between 40% and 45% core flow. Operation in Region C is allowed only for control rod withdrawals during startup for required fuel preconditioning. Region D consists of the rest of the operating map. No core thermal-hydraulic stability related restrictions are applied to Region D since the potential onset of core thermal-hydraulic instabilities is not predicted within Region D.

The definition of Regions A, B and C is based on BWR stability operational data and required operator actions. Although a large margin to onset of instability was observed in Regions A, B and C during GGNS stability tests for typical operating configuration, a conservative approach is adopted in the specification.

With no reactor coolant system recirculation loops in operation, and the reactor mode switch in the Run position, an immediate reactor shutdown is required. Reactor shutdown is not required when recirculation pump motors are de-energized during recirculation pump speed transfers. Upon entry to Region A an immediate reactor shutdown is required. Upon entry to Region B or Region C, unless operation in Region C is for control rod withdrawals during startup, either a reduction of THERMAL POWER to below the 80% rod-line by control rod insertion or an increase in core flow to exit the region by opening the recirculation loop FCV is required.

Per the specification, the APRM neutron flux noise level should be observed while in Regions B and C. In the unlikely event in which a sustained

3/4.4.1 RECIRCULATION SYSTEM (Continued)

APRM neutron flux noise level exceeding 10% peak-to-peak of RATED THERMAL POWER is observed, an immediate reactor shutdown is required.

The APRM neutron flux noise level of 10% peak-to-peak of RATED THERMAL POWER is established to ensure early detection of core thermal-hydraulic instabilities. APRM neutron flux noise levels in the range of 2% to 6% peak-to-peak of RATED THERMAL POWER were observed for the Grand Gulf Reactor during its first three operating cycles and at different power/flow operating conditions. This represents the typical APRM neutron flux noise level for stable operations of the Grand Gulf Reactor.

The 10% peak-to-peak of RATED THERMAL POWER noise level provides adequate margin to thermal limits in the unlikely event of uncontrolled limit cycle oscillations while in Regions B and C, including the even less likely event of regional oscillations. The required operator action of an immediate reactor shutdown upon entry to Region A and upon detection of sustained APRM neutron flux noise level greater than the 10% peak-to-peak of RATED THERMAL POWER assures that an adequate margin to thermal limits will be maintained at all times.

In order to prevent undue stress on the vessel nozzles and bottom head region, the recirculation loop temperatures shall be within 50°F of each other prior to startup of an idle loop. The loop temperature must also be within 50°F of the reactor pressure vessel coolant temperature to prevent thermal shock to the recirculation pump and recirculation nozzles. Since the coolant in the bottom of the vessel is at a lower temperature than the coolant in the upper regions of the core, undue stress on the vessel would result if the temperature difference was greater than 100°F. During single loop operation, the condition may exist in which the coolant in the bottom head of the vessel is not circulating. These differential temperature criteria are also to be met prior to power or flow increases from this condition.

The recirculation flow control valves provide regulation of individual recirculation loop drive flows; which, in turn, will vary the flow rate of coolant through the reactor core over a range consistent with the rod pattern and recirculation pump speed. The recirculation flow control system consists of the electronic and hydraulic components necessary for the positioning of the two hydraulically actuated flow control valves. Solid state control logic will generate a flow control valve "motion inhibit" signal in response to any one of several hydraulic power unit or analog control circuit failure signals. The "motion inhibit" signal causes hydraulic power unit shutdown and hydraulic isolation such that the flow control valve fails "as is." This design feature insures that the flow control valves do not respond to potentially erroneous control signals.

3/4.4.1 RECIRCULATION SYSTEM (Continued)

Electronic limiters exist in the position control loop of each flow control valve to limit the flow control valve stroking rate to 10±1% per second in the opening and closing directions on a control signal failure. The analysis of the recirculation flow control failures on increasing and decreasing flow are presented in Sections 15.3 and 15.4 of the FSAR respectively.

The required surveillance interval is adequate to ensure that the flow control valves remain OPERABLE and not so frequent as to cause excessive wear on the system components.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 62 TO FACILITY OPERATING LICENSE NO. NPF-29

SYSTEM ENERGY RESOURCES, INC.

GRAND GULF NUCLEAR STATION, UNIT 1

DOCKET NO. 50-416

1.0 INTRODUCTION

By letter dated December 19, 1988 (Ref. 1), as revised February 24, 1989, System Energy Resources, Inc., (SERI or the licensee) requested an amendment to Facility Operating License No. NPF-29 for the Grand Gulf Nuclear Station, Unit 1, (GGNS-1). The proposed amendment would change the Technical Specifications (TS) by deleting TS 3/4.3.10, Neutron Flux Monitoring Instrumentation, and modifying TS 3/4.4.1, Recirculation System. Figure 3.4.1.1-1, Power Flow Operating Map, would be changed to redefine flow stability regions. TS 3/4.4.1 would be changed to reflect the redefined regions of Figure 3.4.1.1-1. The Bases for TS 3/4.3.10 and TS 3/4.4.1 would be changed to reflect the changes in TS. The proposed changes would alter some of the boundaries of, and allowed or required operation or surveillance within, regions of the power-flow map with potential for thermal hydraulic stability (THS) problems. The submittal included a report (Ref. 2) describing methodology used to determine decay ratios (DR) associated with BWR THS, benchmarks of the methodology and sensitivity studies done for GGNS-1 comparing THS characteristics of General Electric Company (GE) and Advanced Nuclear Fuels (ANF) fuel assemblies. Discussions between the staff and SERI representatives, and the publication of NRC Bulletin 88-07, Supplement 1 (Ref. 3) resulted in SERI's letter dated February 24, 1989 (Ref. 4) submitting several changes to the proposed TS to comply with the Supplement, and additional information. The staff review of these submittals, particularly the report discussing methodology, has been assisted by NRC consultants at Oak Ridge National Laboratory (ORNL).

The proposed changes to TS 3/4.3.10, which is deleted, and to TS 3/4.4.1 and corresponding Bases bring surveillance and operations relating to THS more directly in line with the GE "Interim Recommendations for Stability Actions" (IRSA), which are presented in the Bulletin Supplement (Ref. 3). These recommendations, along with other staff requests presented in the Supplement and in the initial Bulletin (Ref. 5), constitute current NRC recommendations for BWR THS related operations. They are the result of calculations and reviews by the NRC, the BWR Owner's Group (BWROG) and associated consultants following the LaSalle instability event of March 9, 1988. The Supplement requested that licensees implement the IRSA (and other associated requests) by modifying relevant procedures. Modification of TS was not specifically requested since it is expected that long-term solution implementation will begin within about a year. SERI has responded to the initial Bulletin and to the Supplement, and has indicated that the requested changes to operator training and procedures have been made for GGNS-1. They have also proposed the changes to the TS under review here to provide a more direct correspondence between TS and procedures and to increase effectiveness of operator actions.

2.0 EVALUATION

The IRSA specify three regions (A, B, C) on the power-flow map involving different degrees of allowed or prohibited operation. These are bounded by constant flow lines or control rod lines (lines of flow variation with all other reactor parameters, particularly control rod position, held constant). Region A is above the 100 percent rod line (intercepts 100 percent rated power at 100 percent rated flow) and below 40 percent flow. Region B is between the 80 and 100 percent rod lines and below 40 percent flow. Region C is above the 80 percent rod line and between 40 and 45 percent flow. Deliberate entry into regions A and B is not permitted, and if it occurs immediate exit is required. For a group 2 plant (such as GGNS-1) immediate scram is required in region A, while for region B control rod insertion or flow increase may be used to exit. Operations may be conducted in region C, with suitable surveillance, if required during "startups" to prevent fuel damage. If during operations in B or C instability occurs, the reactor shall be scrammed, with evidence for instability coming from Average Power Range Monitor (APRM) oscillation greater than 10 percent or Local Power Range Monitor (LPRM) upscale or downscale alarms.

In addition to implementation of the IRSA, the Bulletin Supplement requested licensees with: (1) reactors in IRSA group 2 (such as GGNS-1) to initiate an immediate scram for a trip of both recirculation pumps, (or "no pump operating") when in the RUN mode, and (2) reactors with fuel other than that supplied by GE to evaluate and justify the A, B, C region boundaries to be used based on operating experience, calculations and/or DR measurements. The latter request was because the IRSA boundaries were based primarily on experience with reactors using GE fuel.

The present SERI submittal: (1) proposes changes to the THS TS so that the specified power-flow map THS boundaries, operations and surveillance correspond to IRSA, and add the NRC requested scram for "no pumps operating," (2) shows by analyses and operating tests and experience that IRSA boundaries, based on GE fuel experience, are suitable for the ANF supplied GGNS-1 fuel, and (3) describes and justifies the methodology, primarily RETRAN, used in sensitivity studies to compare DRs for ANF and GE fuel loadings.

The proposed TS changes consist of the deletion of TS 3/4.3.10 and extensive changes to the THS sections of 3/4.4.1 (and Figure 3.4.1.1-1). Currently TS 3/4.3.10 provides requirements for using the APRM and LPRM noise levels as a monitor of instability. It requires establishment of a base noise level for those detector systems and provides limits on the magnitude of noise increase allowed (or departure from the region) when operating in region I of current Figures 3.4.1.1-1. Stability monitoring in the proposed TS is provided in TS 3/4.4.1, and corresponds more closely to the IRSA indicated monitoring.

Proposed changes to TS 3/4.4.1 affect only the sections relevant to THS (although the order of some other sections is changed). The primary changes are to Figure 3.4.1.1-1 altering the current region boundaries and designations so that they correspond to the IRSA regions. This changes the boundaries of current region I somewhat (and changes the designation to region C) and separates current region IV into IRSA regions A and B. The Specification prohibits operation in region A and B, and to some extent in region C. It requires, if the regions are entered, departure by scram in region A and by control rod insertion or flow increase (if a recirculation pump is operating at fast speed) in region B and C. (Bulletin, Supplement 1, allows entry into, and through, region C for flow increase departure from B.) Operation in region C is permitted for control rod withdrawals during startup for required fuel conditioning. (This would include restart or power increase from zero or low power conditions, but not other types of operations in region C, e.g., rod pattern exchange.) The TS also requires immediate scram, when the reactor mode switch is in the RUN position, when both recirculation pumps are not operating. (This does not include deenergizing during pump speed transfers.) This is in compliance with the staff request in the Bulletin Supplement.

During operation in region B or C, while departing from the region, and for region C during allowed operations, the TS require surveillance of significant oscillation potential via monitoring of APRM neutron flux level. A 10 percent (of rated power) peak-to-peak noise level (typical steady-state normal noise level is about 2 to 6 percent) requires immediate scram. In addition procedures require monitoring of LPRM upscale/downscale alarms as recommended by IRSA.

These TS changes and additions and procedures appropriately implement the recommendations and requests of the Bulletin Supplement for operations within the specified regions of the power-flow map. The proposed TS are acceptable. The Bases for TS 3/4.3.10 have been removed and for TS 3/4.4.1 have been changed and extensively augmented to describe the regions, operations and requirements. These changes are also acceptable. The acceptance of the region boundaries used in these TS assumes that the boundaries are applicable to the ANF fuel loading currently used in GGNS-1. That assumption is considered next.

GGNS-1 has changed from a first cycle all GE 8x8 fuel loading (via approximately equal increases of ANF fuel each cycle) to an all ANF 8x8 fuel loading in Cycle 4. (There are 4 ANF 9x9 Lead Test Assemblies in Cycle 4, but these should have no significant influence on THS.) Current GGNS-1 region I boundaries are based on ANF calculations using COTRAN and (previous) NRC criteria on DR limits for region boundaries. SERI has proposed in the submittal that the COTRAN calculations are too conservative because they did not include significant parts of the reactor system. They propose that stability characteristics of the ANF and GE fuels, and other core THS parameters are very similar, and thus the overall DR characteristics of the reactor are essentially the same for the GGNS-1 ANF 8x8 fuel cores or for a GE 8x8 core. Thus the IRSA region boundaries, based on GE fuel experience, are also applicable to GGNS-1. As the basis for the proposed similarity in THS characteristics, SERI has discussed (1) the physical similarity of the ANF and GE fuel and core design and normal variations, (2) calculation sensitivity studies (Ref. 2) using the RETRAN-frequency domain methodology and the resulting comparisons of the ANF and GE fuel and core THS characteristics and DR (including the DR for the four GGNS-1 cycles with varying ANF/GE fuel ratios), and (3) the stability measurements made at GGNS-1 (by ORNL for the NRC).

The staff and ORNL consultants have reviewed these stability calculations, as well as the methodology used for the calculations and the justification for the methodology, the sensitivity studies and ANF/GE comparisons, and the experimental tests (by ORNL) at GGNS-1. This review has concluded that the relevant fuel assembly and core reload parameter characteristics and variations are sufficiently similar to expect similar reactor DR, and fuel and core calculations confirm that expectation. Furthermore, parametric calculations over a range of reactor conditions performed at ORNL with the LAPUR stability code support the SERI position that there is no significant overall difference in reactor stability for GE and ANF 8x8 fuel loadings. Differences between GE and ANF fuel DR for specific fuel parameters are small and generally tend to cancel out when combined. The stability tests at GGNS-1, while not conclusive (because of the restricted range of the tests), provide additional evidence for margin to instability with a significant loading of ANF fuel. The review has thus concluded that the stability characteristics of the ANF fuel currently used in GGNS-1 are sufficiently similar to GE 8x8 fuel that the IRSA region boundaries may be used for GGNS-1. This conclusion applies only to the ANF 8x8 fuel and not, for example to ANF 9x9 fuel, which has not been reviewed here. Reloads with other fuel will require reevaluation.

The staff and ORNL consultants have also reviewed the RETRAN methodology (Ref. 2) used for the stability calculations and the benchmarking of the methodology. It is based on the RETRAN thermal hydraulics, using point kinetics for the neutronics. The THS calculations examine the transients following an imposed pressure decrease and use a Fast Fourier Transform to the frequency domain from which a DR can be obtained. The code has been benchmarked against noise analysis stability data from GGNS-1 during Cycle 2. The agreement is reasonable, but the range of DR is limited. Results from the code have also been compared to results from GE and ANF calculations with reasonable agreement. The review has indicated that, while there are several modeling assumptions that can adversely affect stability calculation accuracy, the overall methodology is reasonable and acceptable within limits. The staff did not directly attempt to consider more than the methodology role in the present TS review, and for that role concludes that the code is useful for scoping calculations and for comparative analysis such as are involved in the ANF/GE comparisons, and is thus acceptable as used in the present submittal.

Based on its the review, the staff concludes that the proposed TS changes and the material submitted to support the changes are acceptable. It should be noted, however, that the NRC staff, its consultants, BWROG, GE and others are continuing the review of THS concerns. The BWROG is developing several long term solutions for the problem. It is expected that a selection will be announced by the end of 1989. Any new requirements resulting from the continuing generic review of THS concerns and BWROG long-term solutions will be applicable to GGNS-1 and may impact some of the operations, systems, surveillance or TS found to be acceptable in this review.

In summary, we have reviewed the reports submitted by SERI for GGNS-1 proposing TS changes relating to THS requirements for power-flow map operating restraints and surveillance. We have also reviewed the plant THS experience and tests, and the sensitivity studies, comparative core DR calculation and the accompanying methodology description and benchmarking. Based on this review, we conclude that appropriate documentation was submitted, staff questions were appropriately responded to and the proposed TS changes satisfy staff positions and requirements in these areas. Operations with GE or ANF 8x8 fuel in the regions and in the modes proposed by SERI are acceptable. (Other fuels are not included in this review.) This conclusion may be subject to future review based on results from the staff continuing generic review and conclusions on long term solutions. We further conclude that the RETRAN-frequency domain methodology described in Reference 2 is sufficiently justified for use in DR sensitivity and GE/ANF core stability comparisons as used in this submittal. However, we have not concluded at this time that the methodology has been justified for use in any wider area.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released off site; and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

The Commission made a proposed determination that this amendment involves no significant hazards consideration, which was published in the Federal Register (54 FR 23324) on May 31, 1989, and consulted with the State of Mississippi. No public comments or requests for hearing were received, and the State of Mississppi did not have any comments.

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and the security, or to the health and safety of the public.

Principal Contributor: H. Richings

Dated: August 31, 1989

References

1. Letter and enclosures from W. Cottle, SERI, to NRC, dated December 19, 1988, "Reactor Core Stability, Proposed Amendment to Operating License."

2. NESDQ-88-005, "Boiling Water Reactor Core Reactivity Stability Methodology, Sensitivity and Benchmark Analyses," dated December 1988.

3. NRC Bulletin No. 88-07, Supplement 1, "Power Oscillations in Boiling Water Reactors (BWR)," dated December 30, 1988.

4. Letter and enclosures from W. Cottle, SERI, to NRC, dated February 24, 1989, "Response to RAI in Support of Proposed Amendment on Core Stability."

5. NRC Bulletin No. 88-07, "Power Oscillations in Boiling Water Reactors (BWR)," dated June 15, 1988.

AMENDMENT NO. 62 TO FACILITY OPERATING LICENSE NO. NPF-29 - GRAND GULF

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